

IN THE SPECIFICATION

Replace the title on page 1, line 1 with:

"AN APPARATUS FOR PROVIDING A SELF-PINNED LAYER IN A
DIFFERENTIAL GMR SENSOR WITHOUT ANTIFERROMAGNETIC (AFM) LAYERS"

Replace the paragraph beginning at page 18, line 14 with the following replacement paragraph.

Accordingly, when the spin valve read head [[52]] 500 is subjected to a magnetic field of one polarity, the spin valve sensor 530 will produce a response signal of one polarity and the spin valve sensor 532 will produce a second signal of opposite polarity. The response signals are 180° out of phase with respect to one another and are differentially detected by the differential amplifier [[144]] 544, which combines the response, signals to produce an enhanced response signal free of the noise picked up by the sensors due to common mode noise rejection.

Replace the paragraph beginning at page 22, line 6 with the following replacement paragraph.

Fig. 8 is a stack 800 representing a differential GMR head having an in-stack exchange bias structure according to an embodiment of the present invention. The in-stack exchange bias structure 830 of Fig. 8 achieves antiparallel magnetizations for the free layers 844, 846 without using antiferromagnetic layer in the bias structure 830. The in-stack exchange bias structure 830 of Fig. 8 also allows changing the gap length.

Replace the paragraph beginning at page 24, line 1 with the following replacement paragraph.

Fig. 10 illustrates a method 1000 for forming a differential GMR head according to an embodiment of the present invention. The method described with reference to Fig. 10 includes features from all of the embodiments described above. However, one skilled in the art will recognize that the method for forming a differential GMR head according to embodiments of the present invention is not meant to require every feature shown.

Replace the paragraph beginning at page 24, line 6 with the following replacement paragraph.

In Fig. 10, a first shield and gap layer are formed. A first GMR sensor is formed 1010. The first GMR sensor includes a pinned layer implemented using three ferromagnetic layers 1020 to provide 180° magnetization phase between the pinned layers that are next to the spacer layers. The first GMR sensor also includes a spacer layer and a free layer 1030. The free layer includes a first free layer an interlayer and a second free layer. A gap layer is formed over the first GMR sensor 1040. The gap layer provides an in-stack exchange bias structure that provides antiparallel magnetizations for the free layers without using antiferromagnetic layer. The gap layer may include four ferromagnetic layers such as NiFe separated by an interlayer such as Ru. The gap layer may alternatively includes a layer have a structure of Ta/Al₂O₃/NiFeCr/CuO_x. A second GMR sensor is formed over the gap layer. The [[first]] second GMR sensor includes a pinned layer implemented using three ferromagnetic layers 1050 to provide 180° magnetization phase between the pinned layers that are next to the spacer layers. The [[first]] second GMR sensor also includes a spacer layer and a free layer 1060. The free layer includes a first free layer an interlayer and a second free layer.